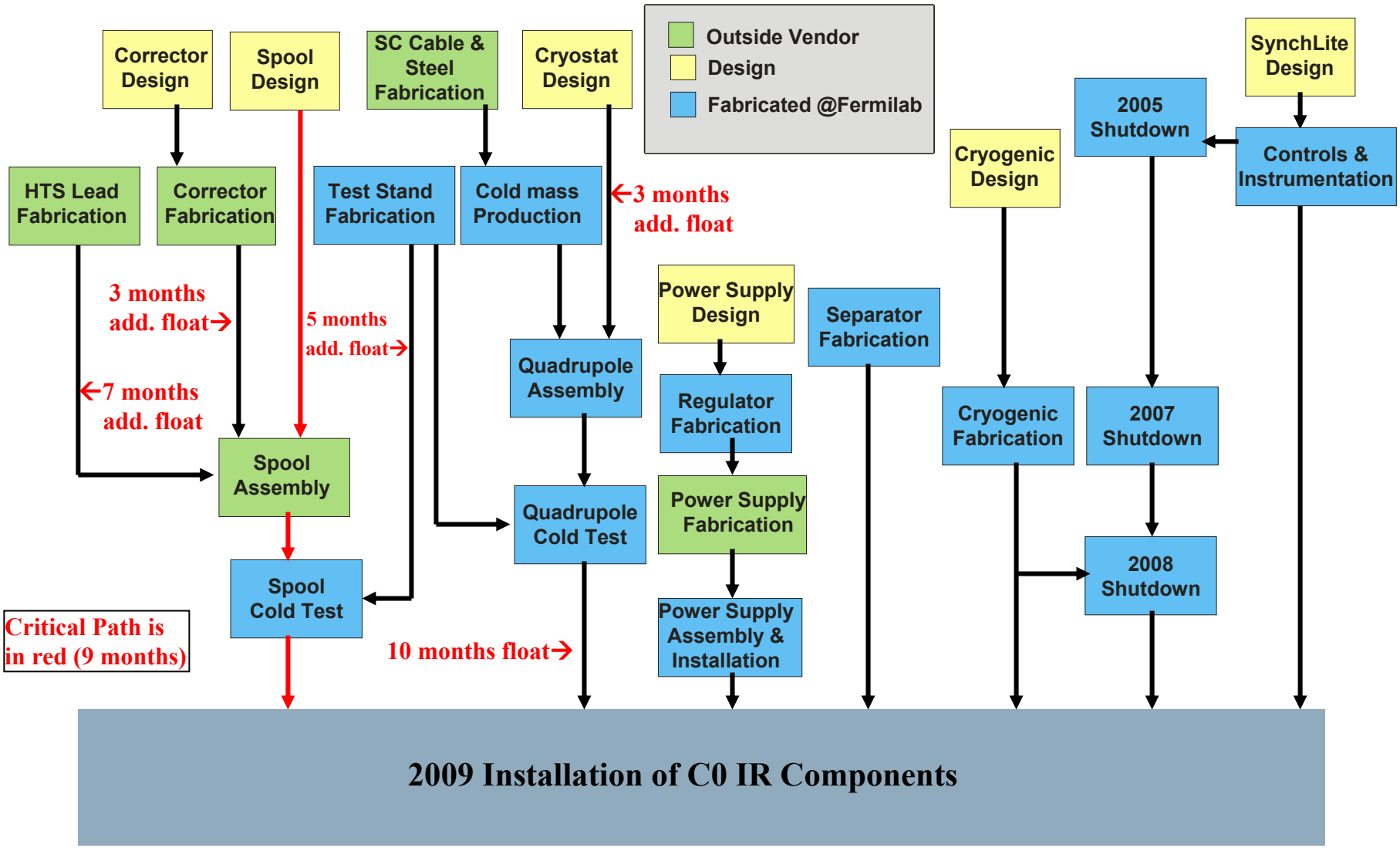
WBS 2.0 Schedule Changes

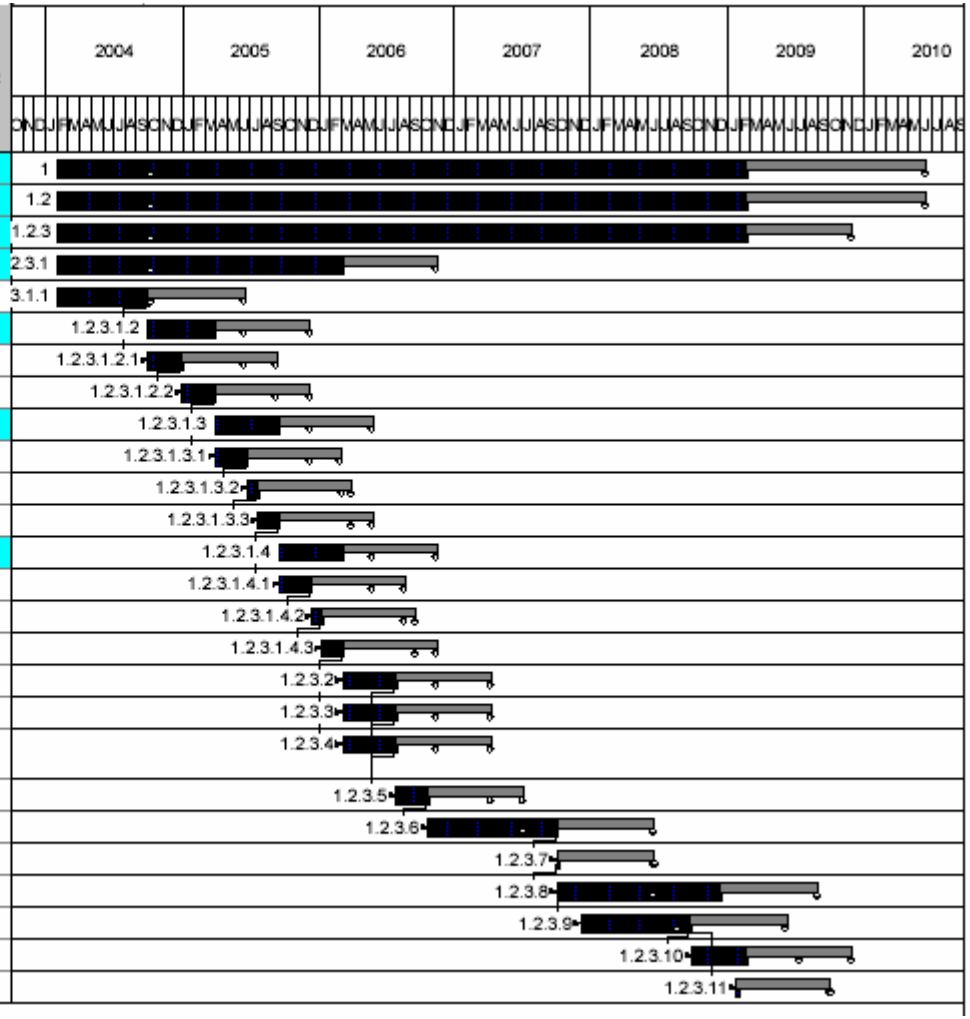
Mike Church (WBS 2.0)

Project Flow



Critical Path

Activity ID	Activity Description	Original Duration	Total Float
1	New magnet fabrication and test	1276d	175d
1.2	New Spools	1276d	175d
1.2.3	SPOOL ASSEMBLY	1276d	175d
1.2.3.1	Spool Design	531d	175d
1.2.3.1.1	Conceptual Design	171d	175d
1.2.3.1.2	X1 Design	120d	175d
1.2.3.1.2.1	Helium Vessel	60d	175d
1.2.3.1.2.2	Vacuum Vessel	60d	175d
1.2.3.1.3	X2 Design	120d	175d
1.2.3.1.3.1	Helium Vessel	60d	175d
1.2.3.1.3.2	LN2 System	20d	175d
1.2.3.1.3.3	Vacuum Vessel	40d	175d
1.2.3.1.4	X3 Design	120d	175d
1.2.3.1.4.1	Helium Vessel	60d	175d
1.2.3.1.4.2	LN2 System	20d	175d
1.2.3.1.4.3	Vacuum Vessel	40d	175d
1.2.3.2	Bidding Process	100d	175d
1.2.3.3	Bidding Process (with EXEMPT M&S)	100d	175d
1.2.3.4	Bidding Process for spares (With EXEMPT M&S)	100d	175d
1.2.3.5	Contract Evaluation	60d	175d
1.2.3.6	Prototype Fabrication & Test	240d	175d
1.2.3.7	Spool Contingency Task	0	175d
1.2.3.8	Final Production and Oversight	300d	175d
1.2.3.9	Spool Cold Tests	200d	175d
1.2.3.10	Spare Spools Cold Tests	100d	197d
1.2.3.11	Spool Contingency Task	0	175d



Critical Path Changes

Critical path float went from 0 months to +9 months

- 2009 shutdown corrected (+2 months float)
- Last spool required later than shutdown start (+2 months float)
- Last spool redefined as last "required" spool (+1 month float)
- Design, procurement, fabrication times re-analyzed
  - Spool bidding process (+7 months float)
    - Additional up front design effort has made this possible
  - Spool production (-3 months float)
    - Closer analysis of DFBX production experience
- In addition, corrector procurement process was reduced by 4 months to remove it from the critical path
    - Based on communication with 4 labs; have detailed schedule estimates from BNL and CERN

Key "Ready By" → "Need By" Floats

ID	Activity	Date	Float (days)	Duration (days)	Float/Duration (%)
14.3.1	Lk4M: Quadrupoles ready for installation	12Dec08	200	1171	17
14.3.2	Lk4M: Spools ready for installation	23Jan09	175	1176	15
14.3.3	Lk4M: 2005 shutdown preparations ready	23May05	52	120	43
14.3.6	Lk4M: Power Supplies ready for hookup	26Aug08	233	476	49
14.3.8	Lk4M: Cryo components ready to install	01Oct08	208	760	27
14.3.9	Lk4M: Controls ready to install	20May08	301	412	73
14.3.10	Lk4M: Synch light monitor ready to install	23May05	22	190	12
14.3.11	Lk4M: BPMs ready	15Sep05	240	240	100
14.3.12	Lk4M: Separators ready to install	19Dec08	194	560	35
14.3.13	Lk4M: 2008 shutdown preparations ready	20May08	51	160	32
14.3.15	Lk4M: 2007 shutdown preparations ready	20Apr07	73	100	73
14.3.17	Lk4M: 2009 shutdown preparations ready	26Mar09	89	120	74

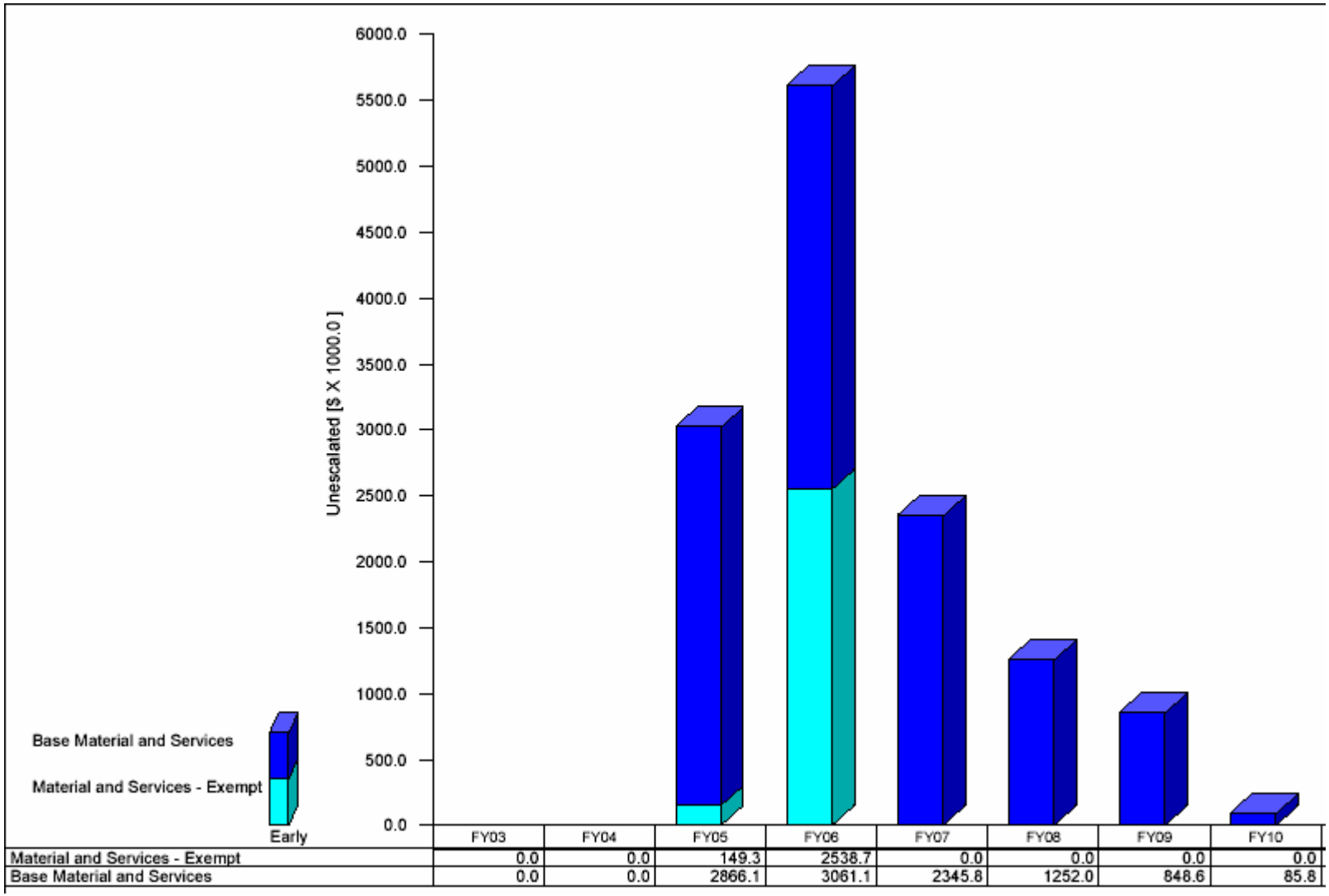
Old Construction Cost

Old Base cost: $25.9M (Material: $13.1M, Labor: $12.8M)

Activity ID	Activity Name	Base Cost ($)	Material Contingency(%)		Labor Contingency(%)	Total FY05	Total FY06	Total FY07	Total FY08	Total FY09	Total FY05-09
2.1	New magnet fabrication and test	17,082,166	17,000,540	38	40	6,428,287	9,688,367	4,015,679	2,802,712	841,379	23,776,425
2.2	2005 shutdown	591,241	570,145	40	40	809,969	16,641	0	0	0	826,611
2.3	Power supplies	2,523,793	2,423,298	40	40	0	0	2,227,239	1,306,071	0	3,533,310
2.4	Cryogenic systems	1,395,397	1,395,397	27	39	0	301,788	690,082	902,234	0	1,894,104
2.5	Controls	495,638	495,638	45	23	0	0	331,092	77,784	236,462	645,338
2.6	Instrumentation	160,689	186,672	40	40	224,964	0	0	0	0	224,964
2.7	Electrostatic separators	724,803	724,803	40	40	0	0	605,874	374,868	33,983	1,014,724
2.8	2008 Shutdown	646,267	575,491	40	34	0	0	0	894,376	0	894,376
2.10	2007 Shutdown	454,836	437,435	40	40	0	0	631,114	5,656	0	636,770
2.11	2009 shutdown	1,825,988	2,114,905	40	40	0	0	0	178,493	2,378,940	2,557,433
2.12	Hardware commissioning	38,993	102,344	0	40	0	0	0	0	54,590	54,590
2	Subproject 2.0	25,939,811	26,026,671	39	39	7,463,221	10,006,797	8,501,080	6,542,194	3,545,354	36,058,645

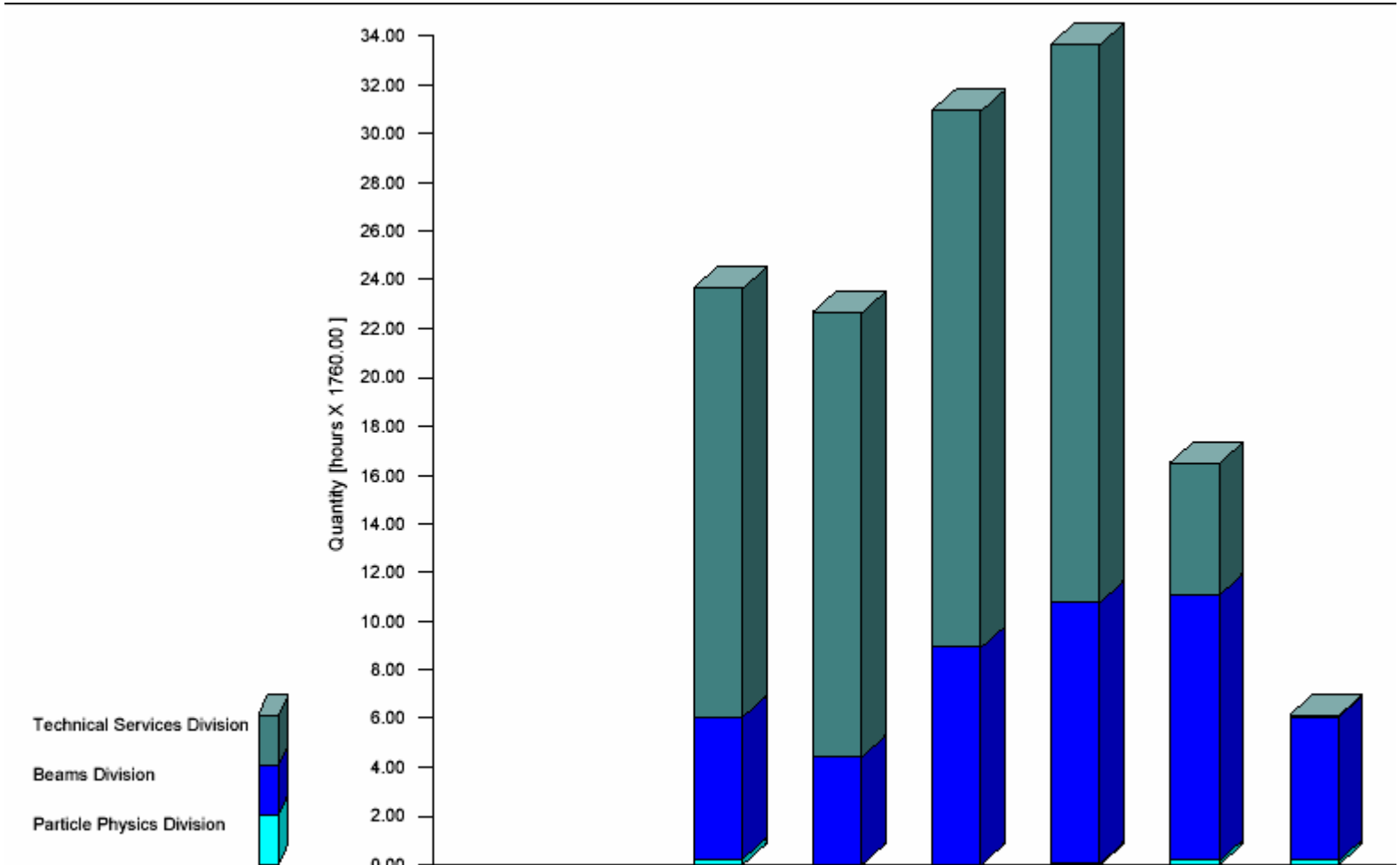
New Base cost: $26.0M (Material: $13.1M, Labor: $12.9M)

New M&S Obligation Profile by Fiscal Year



	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10
Material and Services - Exempt	0.0	0.0	149.3	2538.7	0.0	0.0	0.0	0.0
Base Material and Services	0.0	0.0	2866.1	3061.1	2345.8	1252.0	848.6	85.8
change from CD-1 (K$) →			-10	+746	-747	-346	+285	+86

New Labor Profile by Fiscal Year



	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10
Particle Physics Division	0.00	0.00	0.19	0.00	0.00	0.05	0.14	0.15
Beams Division	0.00	0.00	5.82	4.41	8.90	10.68	10.89	5.86
Technical Services Division	0.00	0.00	17.58	18.21	21.96	22.90	5.44	0.09

change from CD-1 (FTEs) → +0.5 +0.7 -0.8 -1.8 -4.5 +6.1

Summary

- Critical path float is 9 months (spools)
- Next critical path float is 10 months (quadrupoles)
- Floats are accurately calculated in Open Plan
- Total base cost up ~87K$ (0.3%) since CD-1 review